2-BAY RAX™ QR
USER MANUAL

Covers models RAX210-QR, RAX211-QR, RAX212-QR, RAX215-QR, and 219-QR

(Revised June 6, 2011)

Features

- Multiple connection options for wide compatibility

- Hardware RAID 1 protects against data loss due to drive failure by mirroring the drives in real time

- Variety of bay types available. TrayFree models (RAX210) allow easy insertion and removal of hard drives. Models with removable carriers (RAX211, RAX212, RAX215) enclose and protect hard drives when removed from the RAX.

- Specially-designed drive and carrier interfaces are built to withstand thousands of insertions

- LED indicators for Power, Access, System, and RAID

- Superior cooling with dual 40mm exhaust fans

- Rugged all-metal construction for superior durability

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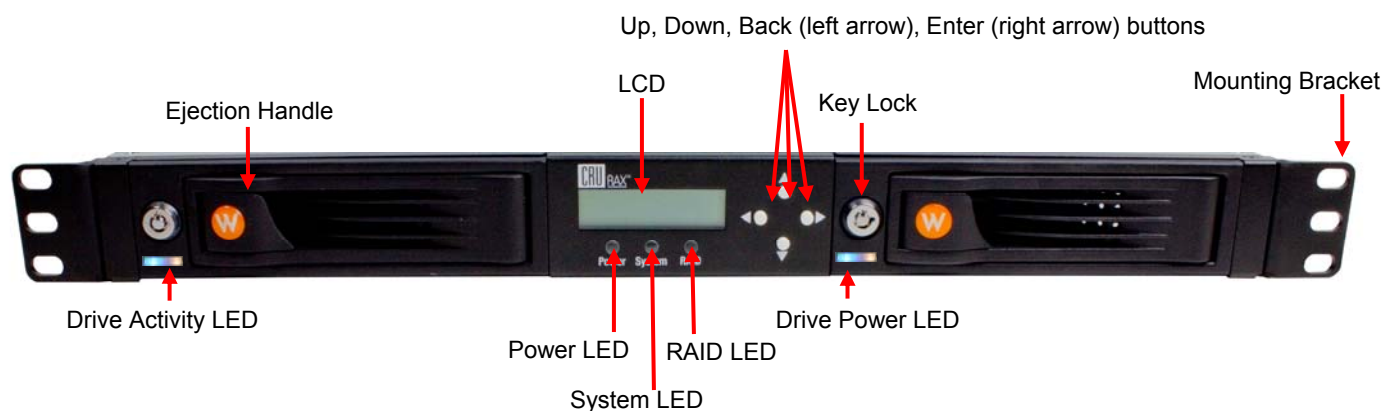
1.1 RAX QR Accessories

Check the accessories with your RAX QR. Please contact CRU if any parts are missing or damaged. The box should contain the following items:

Accessories	Quantity
RAX QR unit	1
Power cord	1
Key set	1
Screw kit	1
Quick Start Guide and warranty information	1

1.2 Identifying Parts

Take a moment to familiarize yourself with the parts of RAX QR. This will help you to better understand the remaining instructions.

Front View

Up, Down, Back (left arrow), Enter (right arrow) buttons

LCD Key Lock Mounting Bracket

Ejection Handle

Drive Activity LED

Power LED RAID LED

Drive Power LED

System LED

Rear View

4cm Exhaust Fan AC Power Inlet

USB Port

Power Switch (On/Off)

eSATA Port FireWire Ports
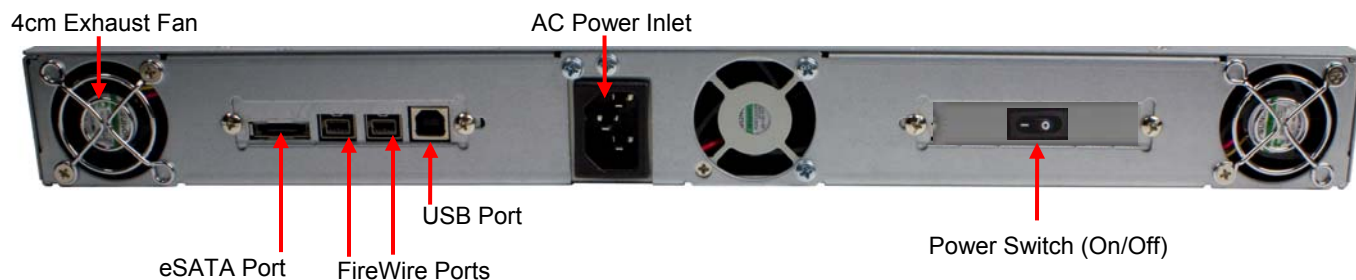
1.3 Consider your RAID Configuration
If you purchased RAX QR with drives pre-installed and pre-configured, skip to Hardware Setup.

RAX QR supports RAID 0, RAID 1 and a single drive. Consider which configuration best suits your needs. All hard drives must be initialized prior to use in RAX QR. It is not possible to add a drive to RAX QR and access existing data on that drive. Before it can be readable, the hard drive must be initialized by RAX QR which will cause the loss of all data on the drive. The drive(s) must be configured to RAID 0, RAID 1 or a single drive.

1.3.1 RAID 0
In this mode, RAX QR will configure the drives in a "striped" RAID. This will split your data between the drives, offering faster performance and allowing you to use the full capacity of the drives in a single volume. However, RAID 0 offers no data redundancy, so all data is unrecoverable if either drive fails.

1.3.2 RAID 1
In this mode, RAX QR will "mirror" the two drives for best data protection. In this mode, you will work with a single volume equal in size to the capacity of one drive. When you copy data to the volume, RAX will simultaneously write the data to both drives. If one drive were to fail, your data would still be preserved on the other drive. After replacing a failed drive you can rebuild the RAID on the fly so that your data is once again redundant and secure.

1.3.3 Single Disk Mode
In this mode RAX QR will support a single drive.

> NOTE: There is no way to convert a drive in Single Disk Mode to RAID 1 without creating a new array which will cause the loss of data on the hard drive.

RAID is not a Backup

Because your RAX QR features a redundant RAID mode which protects against a hard drive mechanical failure, it is an excellent part of any backup strategy. However, a RAID is not, in itself, a backup strategy. Many things besides hard drive failure can compromise your data (e.g. malware, theft, fire, etc.) That's why it's important to have another copy of your data somewhere else. Follow the 3-2-1 backup rule: your data should exist in three different places on two different storage media and at least one of those copies should be maintained offsite.

If you do not have an effective backup strategy, you may not be able to recover your data, or the cost of recovery may be quite expensive. Our warranty does not cover costs associated with data loss (nor do the warranties of other hard drive manufacturers). We know it would be heartbreaking to lose your data, so please plan accordingly!

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2. Hardware Setup

2.1 Installing Hard Drives

2.1.1 HDD installation for RAX210-QR

Follow these steps for installing or removing a hard drive from the front bays.

a) Pull on the ejection handle and open the door.
b) Slide in your SATA hard drive, connector-end first. Note: the drive's label should be facing up.
c) Shut the door.

2.1.2 HDD installation for RAX211-QR and RAX212-QR

a) Slide the drive carrier out of the RAX.
b) The carrier's cover is held in place by a screw on the rear of the carrier. Remove the screw then remove the cover.
c) Slide the drive in from the front of the carrier.
d) Mate the connection on the drive with the connection on the drive carrier circuit board.
e) Flip the drive/carrier assembly over, and secure the drive in place with the provided screws.
f) Attach the Temperature Control Cooling Sensor to the top of the drive with an adhesive strip.
g) Replace the carrier cover and secure the screw on the rear of the carrier.
h) Slide the carrier into the RAX.
   NOTE – A flashing **red** LED on the bay indicates bay fan failure. Call CRU technical support.

2.1.3 HDD installation for RAX215-QR

a) Slide the drive carrier out of the frame.
b) The carrier's cover is held in place by two screws—one on either side of the carrier. Remove these screws then remove the cover.
c) Insert the drive into the carrier.
d) Mate the connection on the drive with the connection on the drive carrier circuit board.
e) Flip the drive/carrier assembly over, and secure the drive in place with the provided screws.
f) Replace the drive cover and secure the screw on the rear of the carrier.
g) Slide the carrier into the frame assembly.
   NOTE – A flashing **green** LED on the bay indicates bay fan failure. Call CRU technical support.

2.1.4 Drive, bay, and frame installation for RAX219 and models with one open bay.

2-Bay RAX models can be purchased with one or both bays unpopulated. RAX219 is the "empty bay" model of the 2-bay RAX series. For instructions on how to install your HDD, bay, or frame into these products, please see the install guide that accompanies your particular bay.

2.2 Tips for Rack Mounting RAX QR

Elevated Operating Ambient Temperature: Install the equipment in an environment compatible with the maximum ambient temperature of 40° C

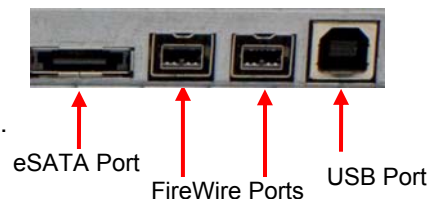**Ventilation:** Do not block or inhibit the air flow to the unit.

Mechanical Loading: Use care to ensure the RAX is mounted in a level position to prevent damage.

Circuit Overloading: Do not overload the circuits. Refer to the name plate ratings on the equipment.

Reliable Grounding: Maintain grounding of rack-mounted equipment by using indirect connections to the branch circuit (e.g. UPS battery backups, power strips).

2.3 Connecting and Powering RAX QR

RAX QR can connect to your computer in one of four ways.
Choose one of those four cable types to use and plug it into the unit.
Plug in the power cord to a grounded electrical outlet.
With hard drives in the unit, turn on the power.
Your RAX QR is ready to use.

eSATA Port   FireWire Ports   USB Port

3. LED Behavior (see section 1.2 for locations of LCDs on the unit)

LED	Behavior
Unit Power	• Glows **green** when the power switch is in the "on" position.
System	• LED is "off" by default. • Configurable (see sections 7.3 and 7.4) • Glows **amber** when a drive reaches a default temperature, or temperature that you set. • Glows **red** when a drive or enclosure reaches a default temperature or the temperature that you set.
RAID	• LED is "off" by default. • Glows **amber** when the RAID is degraded. • Glows **red** when the RAID has failed or is invalid.
Drive Power	• Glows **green** when the drive is in the unit and receiving power.
Drive Activity	• Glows **amber** when the drive is being accessed, either reading or writing from the drive.

NOTE: Not all hard drives support the Drive Activity LED functionality in the same way.

4. LCD Menu Screens (use the navigation buttons to change screens)

Screen	Description
Mode/Status	• The RAID level used • Status of the RAID: Normal or Degraded
Drive Status	• **OK:** Indicates that the hard drive is in use or ready to use. • **No Disk**: Indicates that the hard was removed or not installed. • **Unused**: A new drive was installed and not added to the RAID. • **Failing**: Indicates the drive is malfunctioning. Possible causes of a failure message include an inability to recognize the drive, a compatibility problem, or damaged sectors.
Drive Temp	• Displays temperature of the top and bottom drives, as reported by S.M.A.R.T. status.
Change RAID mode	• Allows you to change the RAID level. (see section 5.2)
Fan/System	• Displays fan speed and system temperature.

5. Setting up the RAID

RAX QR offers three options for RAID configuration. See section 1.3 for details on the three available options. Stop all data transfers before setting or changing RAID types or rebuilding a degraded array. Failure to do so can result in the loss of data. To set up or change the RAID type, disconnect all data cables and reboot RAX QR. After the unit has initialized, the LCD will display the drives' mode and status.

CRU

5.1 Creating a New RAID (use the LCD and front interface buttons to complete this step)

(Follow these steps for setting up a new RAID if you did not purchase your unit pre-configured.)

   a) Upon insertion of new disks, the LCD will read "RAID Error: not a RAID set."
   b) Press "Enter" (right arrow) on the front interface twice.
   c) The LCD screen will display "MAKE A NEW RAID?"
   d) Select "YES."
   e) Select your RAID type (RAID 0 or 1)
   f) The LCD screen will read "Will erase all data OK?"
   g) Select "YES." The RAID is now created.

5.2 Changing the RAID Type

(Use the LCD and front interface buttons to complete this step)

a) Disconnect RAX from the computer.
b) Press the Up button, for the 'Change RAID Mode' screen.
c) Press the Enter (right arrow) button.
d) Press the Down or Up button to select the desired RAID type.
e) The screen display 'Will Erase all Data', pressing OK will
   result in the loss of all data on the drives.
    (Ensure all data is backed up prior to pressing OK.) If data is backed up press Enter (right arrow).
f) The new configuration will be selected and RAX QR will reboot.
g) RAX QR has been configured and is ready for operation. Follow the instructions for the appropriate operating system usage instructions to initialize and format the drives.

> **WARNING:** Changing RAID levels will erase any data on the drives. Make a backup copy of any data you wish to keep before changing the RAID.

6. Adding a new disk

> **WARNING:** Any data on the new disk will be destroyed when the drive is added to the RAID.

6.1 RAID 1
In the event of a disk failure or removal for a RAID 1, the RAID will continue to function in a degraded state. Add a new disk to RAX QR to rebuild the RAID. After the new drive has been detected RAX QR will ask to add a new disk. Press the Enter button to select Yes to add the disk. The disk will be added to the RAID and the RAID will begin to rebuild. The LCD screen will display the percent complete for the rebuild. Rebuild times vary, a 1TB hard drive takes just over 3 hours to rebuild. You can toggle to the approximate time remaining by pressing Enter on the front panel.

> Mode: RAID 1
> Rebuild 1%

6.2 RAID 0
Never remove a drive from a RAID 0 as this will cause the loss of all data. In the event of a disk failure for a RAID 0, the RAID will be destroyed. Add a drive and then press the Up button to create a new RAID. Follow the display prompts to build a new array.

6.3 Single Disk Mode
In the event of a drive failure in Single Disk mode, all data will be lost. Single Disk mode allows usage of a single hard drive. If a second drive is added later, it cannot be combined with the first disk, nor will it provide the option of two individual disks to be seen by the host computer. It will allow the option of creating a new RAID using both disks, though this will destroy any data on both disks.

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7. Buzzer and Temperature Configuration

If you would like to set a password for security, enable or disable audible alarms, or change the temperature thresholds for heat warnings and alarms, you may do so using a free software utility known as Configurator. To download the Configurator software and user manual, please visit http://www.wiebetech.com/software/configurator.php. WiebeTech is a brand of CRU.

7.1 Configuration PIN
This feature allows you to set a PIN to prevent unauthorized configuration. The default PIN is 0000. RAX QR only requires you to enter a PIN if a different value has been set.

7.2 Buzzers
Place a check in the boxes to indicate which warning/alarm buzzers you want to be activated.

7.3 System Warning Buzzer
This buzzer will sound when a drive reaches a default temperature, or a temperature that you set (see section 6.7). As a visual alert, the "system" LED will glow **amber** when the temperature is reached.

7.4 System Alarm Buzzer
This buzzer will sound on 3 occasions:
- When a drive reaches a default temperature or temperature that you set (see section 7.7).
- When the enclosure reaches a default temperature or temperature that you set (see section 7.7).
- When the RAX fan fails.

As a visual alert, the "system" LED on your RAX will glow **red** when any of these three situations occur.

7.5 RAID Warning Buzzer
This buzzer will sound when RAX QR is in degraded RAID mode (a drive has failed and is in need of rebuild or the RAID is rebuilding). The "RAID" LED will glow **amber** if this occurs.

7.6 RAID Alarm Buzzer
This buzzer will sound when the RAID has failed or is invalid. The "RAID" LED will glow **red** if this occurs.

7.7 Temperature Sliders
When your RAX QR reaches a certain temperature, buzzers sound and the fan kicks on. You may want to change these default temperatures according to your environment. With these "sliders," you can change the default temperatures of the:
- Enclosure fan kick-on
- Enclosure Temperature Alarm
- Drive Temperature Warning
- Drive Temperature Alarm
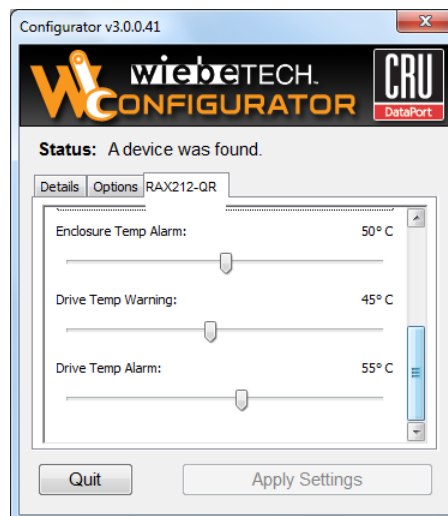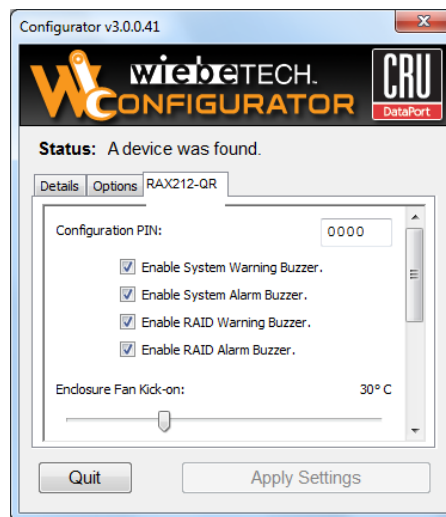
8. Encryption information (RAX212-QR only)

RAX212 includes an internal encryption key preinstalled in each bay. After inserting any drive and formatting it, that drive will only be readable in the RAX212 and will be fully encrypted—including the boot sector, operating system and all files—without performance degradation. The internal key can be overridden by inserting a different key in the front of the bay.

9. Usage with Mac and Windows Operating Systems

## 8.1 Usage with Mac OS X

9.1.1 Compatibility

RAX uses 3.5-inch SATA (Serial-ATA) hard drives only. RAX does not require drivers for operation under Mac OS X. However, if you install a host card specifically to work with this product, that card may require drivers. See your card's user manual for drivers and instructions.

9.1.2 Formatting a drive

If you purchased your RAX pre-populated with hard drives, this step should not be necessary unless you wish to change the format or erase the drive. To format, use Mac OS X's Disk Utility (found in the applications folder).

a) Click on the drive in the window to the left (see picture below).

b) Click the Erase tab in the window to the right (see picture below).

c) Select the format type. Most users prefer Mac OS Extended with Journaling (HFS+), which is required for compatibility with Time Machine (OS 10.5 or newer). If you need to use your RAX with both Mac and Windows computers, select MS-DOS File System instead.

d) Enter a name for the new volume and then click "Erase" to start the process.
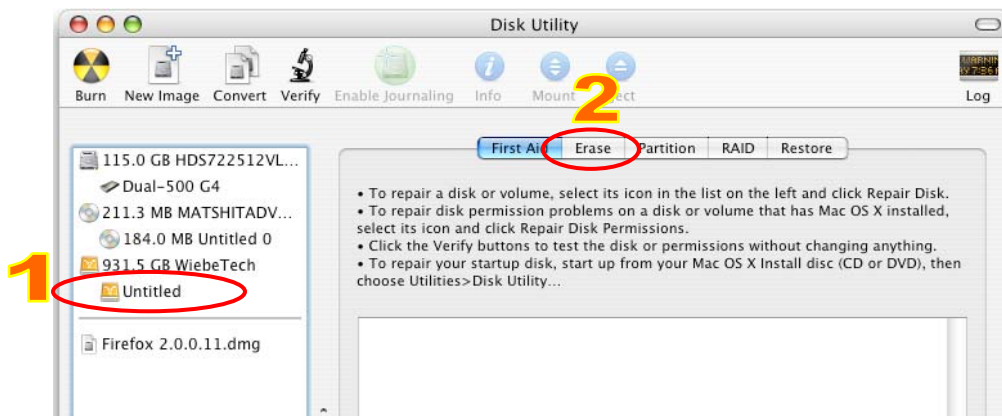
9.1.3 Mounting and unmounting volumes

If the hard drives installed in RAX are already formatted, an icon representing the drive's volume will appear (mount) on the desktop. You can begin using the volume right away. If the drive is unformatted, a message will appear on the desktop saying that the disk is unreadable. You can use OS X's Disk Utility to easily format the drive (see section above).

Unmount the volume before powering down the unit by dragging the volume's icon to the trash bin, or by selecting the volume then pressing Command-E. Disconnecting the unit without first unmounting the volume can result in data loss.

9.1.4 Creating a Boot Drive

To activate this feature, you must first install OS X on the hard drive in your carrier. The easiest way to do this is to clone an existing system drive using a utility such as Carbon Copy Cloner or Super Duper. Next, go to System Preferences → Startup Disk. A window will list the available bootable volumes. Select the volume from which you wish to boot. Another method is to hold down the Option key during boot up. A screen should appear that allows you to select the volume you wish to use. This is useful if you wish to boot from your RAX hard drive only some of the time.

9.2 Usage with Windows operating systems

9.2.1 Compatibility

RAX uses 3.5-inch SATA (Serial-ATA) hard drives only. RAX does not require drivers for operation under Windows XP, Vista, or 7. However, if you install a host card specifically to work with this product, that card may require drivers. See your card's user manual for drivers and instructions.

9.2.2 Formatting a drive

If you purchased your RAX pre-populated with a hard drive, this step should not be necessary unless you wish to change the format or erase the drive. To format, use the Disk Management utility.

a) Right-click on My Computer, then select Manage. The Computer Management window will open.

b) In the left pane of this window, left-click on Disk Management.

c) The drive should appear in the list of Disks in the lower middle/right pane (see picture below). You may need to scroll down to see it. If the drive is already formatted, you can identify it easily by its volume name. If it's unformatted, the Drive Properties Box will say "Unallocated" and you'll need to initialize the disk before formatting it. Initialize the disk by right-clicking the Device Properties Box and selecting Initialize Disk.

d) To format the drive, right-click the Drive Properties Box and select Format.

e) If you are prompted to select a partition type, select MBR for volumes 2TB or smaller, or GPT for volumes larger than 2TB. Note: Windows XP does not support GPT or volumes larger than 2TB.

f) Click through several more windows, leaving the default settings, until you see a window that allows selection of a file system. Choose NTFS and enter a name for the new volume. Be sure to check the box labeled "Perform a quick format" unless you want to completely erase any data on the drive and have time to wait. A quick format should take less than a minute, while standard formatting may take several hours.

g) Click "Next" and then "Finish" to start the format process. When the format is complete, the Drive Properties Box will update to show the new volume name. The new volume can now be found in My Computer
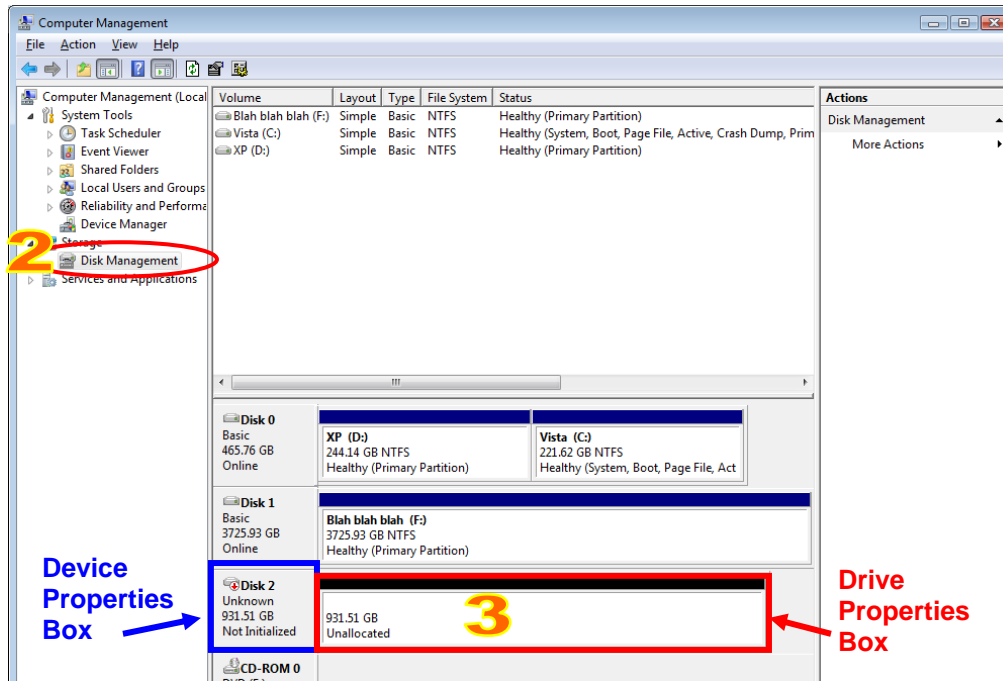
9.2.3 Mounting and ejecting volumes

If the hard drives attached to RAX are already formatted, you can begin using the volume right away. When the unit is properly connected and turned on, a window may open to allow you access to the volume. If no window appears, you can find the volume by double-clicking "My Computer."

Eject the RAX before powering it down by single-clicking the green arrow icon on the task bar, then selecting "Safely remove…." Windows will indicate when it is safe to disconnect RAX. Disconnecting the unit without first ejecting it can result in data loss.

9.2.4 Creating a Boot Drive

Some PC motherboards support booting from an external device. To activate this feature, you will need to adjust the motherboard's BIOS settings. Check with your motherboard's manufacturer or owner's manual for details.

10. Frequently Asked Questions (FAQ)

Q: Why won't the computer let me eject or unmount my drive?
A: There may be a software application running in the background with an active link to the drive. Sometimes, you may see a message such as "The disk is in use and could not be ejected. Try quitting applications and try again."

It could be a background application like Sherlock or the Finder. This is not a defect or issue caused by the device. Try invoking the Force Quit feature in OS X to see what software may be running. For Windows, the equivalent command is CTRL-ALT-DEL.

Drives connected to the computer via eSATA cannot be ejected in Windows the way FireWire drives can. However, freeware utilities are available on the internet that provide a similar function.

Q: I've attached my RAX QR and can see the volume, but it shows up twice. Which one is real?
A: If you are seeing your RAX QR volume mounted twice, chances are the unit is connected to the computer using both the eSATA and FireWire connections. When this is the case, the OS may attempt to mount the RAX twice resulting in two volumes appearing. Simply turn off the RAX and unplug one of the connections to resolve the problem.

Q: Why does my eSATA device appear as a Parallel SCSI device in System Profiler?
A: The "Serial ATA" tab in System Profile shows devices attached to the internal SATA bus, but not always devices attached to an eSATA host card. Sometimes these devices will appear under the heading "Parallel SCSI" instead. This is entirely normal and does not indicate a problem with the device or its drivers.

Q: Will this product work with hard drives larger than 2.2TB?
A: Yes, assuming the rest of your configuration (e.g. OS, BIOS, host drivers) supports large volumes, this product is compatible with drives larger than 2.2TB.

For additional information, please visit www.cru-dataport.com.

11. Technical Specifications

Product name	RAX210-QR, RAX211-QR, RAX212-QR, RAX215-QR, RAX219-QR
Host Connections:	• eSATA • Dual FireWire 800 (IEEE 1394b) • Dual FireWire 400 (IEEE 1394a) if converter cables are used • USB
Drive Types Supported:	3.5-inch SATA (Serial-ATA) hard drives
Encryption:	(RAX212 model only) Full disk hardware encryption, AES 128 or 256
Power LED:	Yes, one per drive
Access LED:	Yes, one per drive
Operating System Requirements:	Windows XP, Vista, Windows 7 Mac OS X Linux distributions that support the connection type used
Power Supply:	Input: 100-240VAC Output: 220 Watts
Cooling Fan:	Dual 40mm exhaust fans
External Material:	Electro-galvanized cold rolled steel
RAX QR Weight:	15 pounds
Shipping Weights:	17 pounds without drives 23 pounds with drives
Dimensions:	(429mm W x 413mm D x 44mm H)
Support:	We don't want anything to go wrong with your CRU-Dataport product. But if it does, Technical Support is standing by and ready to help. Contact Technical Support through cru-dataport.com/support or call (800) 260-9800.

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Limited Product Warranty
CRU-DataPort (CRU) warrants RAX to be free of significant defects in material and workmanship for a period of two years from the original date of purchase. CRU's warranty is nontransferable and is limited to the original purchaser.

Limitation of Liability
The warranties set forth in this agreement replace all other warranties. CRU expressly disclaims all other warranties, including but not limited to, the implied warranties of merchantability and fitness for a particular purpose and non-infringement of third-party rights with respect to the documentation and hardware. No CRU dealer, agent or employee is authorized to make any modification, extension, or addition to this warranty. In no event will CRU or its suppliers be liable for any costs of procurement of substitute products or services, lost profits, loss of information or data, computer malfunction, or any other special, indirect, consequential, or incidental damages arising in any way out of the sale of, use of, or inability to use any CRU product or service, even if CRU has been advised of the possibility of such damages. In no case shall CRU's liability exceed the actual money paid for the products at issue. CRU reserves the right to make modifications and additions to this product without notice or taking on additional liability.

FCC Compliance Statement: "This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation."

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at this own expense.

In the event that you experience Radio Frequency Interference, you should take the following steps to resolve the problem:
1) Ensure that the case of your attached drive is grounded.
2) Use a data cable with RFI reducing ferrites on each end.
3) Use a power supply with an RFI reducing ferrite approximately 5 inches from the DC plug.
4) Reorient or relocate the receiving antenna

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